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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/583,711

10/02/2006

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Q95503

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01/29/2010

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EXAMINER

CALANDRA, ANTHONY J

ART UNIT

PAPER NUMBER

1791

NOTIFICATION DATE

DELIVERY MODE

01/29/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/583,711	<b>Applicant(s)</b> GRONQVIST ET AL.	
	<b>Examiner</b> ANTHONY J. CALANDRA	<b>Art Unit</b> 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☒ Claim(s) 5,6,8,10 and 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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***Detailed Office Action***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/10/2009 has been entered.

Claims 1 and 2 have been amended. Claims 1-25 are pending.

***Response to Arguments***

***112 2<sup>nd</sup> rejections***

The examiner maintains the 112 2<sup>nd</sup> rejections based on the lack of definition for defining enzyme activity.

Applicant states that the person of ordinary skill in the art recognizes the difference between activity measured in micromole and katal. The examiner agrees and made no such argument stating that they weren't different.

PEDERSON teaches that enzyme activity of laccase is defined as the following:

*(37) Laccase activity as defined herein is determined on the basis of spectrophotometric measurements of the oxidation of syringaldazin under aerobic conditions. The intensity of the violet colour produced in the oxidation reaction is measured at 530 nm.*

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*(38) The analytical conditions are: 19 .mu.M syringaldazin, 23.2 mM acetate buffer, pH 5.5, 30.degree. C., reaction time 1 minute, shaking. 1 laccase unit (LACU) is the amount of enzyme that catalyses the conversion of 1 .mu.M of syringaldazin per minute under these conditions"*

CHANDRA gives a second method of defining enzyme activity:

*The activity of laccase was measured by monitoring the rate of oxidation of syringaldazine according to Sealey et al. [188]. The change in **A530nm** 0.001 per minute per ml of enzyme solution in a 100-mM potassium phosphate buffer (2.20 ml) and 0.216 mM syringaldazine in methanol (0.300 ml) was set to one unit (U) of activity. This test was done at 23.0°C and pH 4.5 [pg. 207].*

Sigma-Aldrich, an enzyme manufacture, gives yet a third method for defining activity [see Enzymatic Assay of Laccase] at a pH of 6.5 and a temperature of 30 degrees C.

In contrast the applicant fails to disclose the conditions by which enzyme activity of laccase is measured. More specifically the applicant fails to disclose at what temperature enzyme activity is defined at, the pH it is defined at or what base substance (such as syringaldazine) it is defined at.

The applicant's argument that the determination of enzyme activity is based on each individual experiment is not supported by written description anywhere in the specification. Even giving the applicant this argument the claim would still be rejected based on 112 2<sup>nd</sup>. Since the applicant lists multiple conditions at which the reaction can take place [pg. 7 lines 4-12] and multiple reactants the claim language has no limit as to what 'nkat' can define as activity will change depending on different conditions as such 'nkat' is defined relatively.

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Finally in all of the specific examples given the applicant does not list a temperature in any specific experiment. Temperature clearly effects reaction rate and therefore effects the activity as measure by nkat.

### ***Art Rejections***

Applicant's arguments with regards to PEDERSON, SMOOK, and SUN filed on 12/10/2009 have been considered and found persuasive.

The examiner found convincing that neither PEDERSON, SMOOK, nor SUN disclosed the specific compounds recited by the applicant in the amended claims alone or in combination with each other.

The examiner did not find convincing the applicant's argument that ferulic acid does not introduce a foreign property to the fiber. The point is moot as the applicant has amended the claims and PEDERSON has been withdrawn. However, the examiner maintains that the applicant's arguments are not commensurate with the claim or specification as to the definition of foreign to the material {please see pg. 6 of the final office action dated 6/10/2009 for the examiner's response to the applicant's arguments regarding foreign}.

The examiner did not find convincing the applicant's argument that SMOOK and SUN could not be combined. The applicant argues that SMOOK and SUN are to different features and scope. Both SMOOK and SUN disclose paper making. SMOOK discloses how the paper and pulp can be made. SUN discloses a specific improvement to said paper which the person of ordinary skill in the art would be motivated to perform on the paper of SMOOK.

### ***Claim Objections***

1. Claim 17 is objected to because of the following informalities: Sentence structure does not appear correct ‘...oxygen-containing gases air’ should be ‘oxygen containing gases’.

Appropriate correction is required.

2. Claims 5, 6, 8, 10, and 11 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claims, or amend the claims to place the claims in proper dependent form, or rewrite the claims in independent form.

In claims 5 and 6, the applicant claims properties which the disclosed compounds do not appear to have including metallic particles, pigments, inorganic, radioactive (other than background radiation) thus broadening the claim.

In claims 8, 10, and 11, the applicant claims groups which do not appear to be part of the compounds thus broadening the claim

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3-14, 19, 20, and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by *Chemo-Enzymatic Modification of High-Kappa Kraft Pulps with Laccase* by Chandra, hereinafter CHANDRA.

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As for claim 1, CHANDRA discloses treating a high lignin pulp with [pg 193 Pulp] with an oxidizer, laccase, and a signaling agent Celestine Blue [pg. 193 Pulp treatment].

As for claims 3, 12, 13, and 14, CHANDRA discloses the enzyme laccase [pg. 193 Pulp treatment].

As for claim 4, the Celestine blue is bonded to the pulp and therefore it has been activated.

As for claims 5, 6, and 9, Celestine blue increases the nitrogen content [pg. 198 and Figure 70] and changed the zeta potential, i.e. conductivity [pg. 199 Figure 72] and thus can be considered security agents. Celestine blue additionally changed colors upon the reaction with laccase [pg. 196 lines 1-3].

As for claims 7, 8, 10 and 11, Celestine blue has more than one functional site including but not limited to hydroxyl, amines and amides [pg. 194 Figure 68].

As for claim 19 and 24, the treatment is carried out at a consistency of 15% which falls within the instant claimed range [pg. 193 pulp treatment].

As for claim 20, the reaction temperature is 45 degrees C which falls within the instant claimed range [pg. 193 pulp treatment].

4. Claim 1-25 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,482,514 von RAVEN, hereinafter von RAVEN.

As for claim 1, von RAVEN discloses treating lignocellulose pulp [column 1 lines 39-40] with peroxide [column 5 table 3 lines 24-35] and one or more photoactivators including fluorescein [column 2 lines 25-30].

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As for claim 2, von RAVEN teaches one or more photoactivators including methylene blue and fluorescein [column 2 lines 25-30]. Methylene blue additionally comprises a phenolic group which can bind to lignocellulose. As such methylene blue can be interpreted as a modifying agent and fluorescein as a signaling agent.

As for claims 3, 12, 13, 16, 17, 18, 22, and 25 von RAVEN discloses peroxide [column 5 table 3 lines 24-35] and discloses adding atmospheric oxygen [column 1 lines 59-67].

As for claims 4-7, 9, and 21 von RAVEN discloses the fluorescent compound fluorescein.

As for claims 12-15 and 23 the particulars of the enzyme composition are not required by the claim as written.

As for claim 8, 10 and 11 fluorescein has both carboxy and hydroxy groups.

As for claim 19 and 24 von RAVEN discloses 20% consistency [column 7 lines 3-10].

As for claim 20, von RAVEN discloses the temperature range of 10 to 90 degrees C which falls within the instant claimed range [column 1 line 65].

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 15, 17, 18, 23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Chemo-Enzymatic Modification of High-Kappa Kraft Pulps with Laccase* by Chandra et al., hereinafter CHANDRA.

As for claims 15 and 23, CHANDRA discloses using 6 ml of laccase or  $8.54 \times 10^6$  units of laccase per gram of pulp.

CHANDRA discloses a unit of activity by the following [pg. 207]: The activity of laccase was measured by monitoring the rate of oxidation of syringaldazine according to Sealey et al. [188]. The change in **A530nm** 0.001 per minute per ml of enzyme solution in a 100-mM

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potassium phosphate buffer (2.20 ml) and 0.216 mM syringaldazine in methanol (0.300 ml) was set to one unit (U) of activity. This test was done at 23.0°C and pH 4.5.

The applicant claims an enzyme dosage nkat/g (nanokatal/g) which the examiner has interpreted as an enzyme activity per gram of pulp. However, the applicant does not state what the defined assay conditions this enzyme activity is measured. At different temperatures an enzyme can have different activities. At different pH the enzyme can have different activities. Finally for different compounds that the enzyme is measured against the enzyme can have different values. Therefore the examiner cannot determine the proper metes and bounds of patent protection desired by the applicant.

At the time of the invention it would have been obvious to optimize the enzyme activity and enzyme weight on pulp [2144.05 (II) (B) Optimization of ranges and result effective variables]. CHANDRA clearly shows enzyme activity on pulp to be a result effective variable and therefore its optimization would have been obvious to a person of ordinary skill, absence evidence of unexpected results.

As for claims 17, 18, and 25 CHANDRA does not explicitly disclose adding air or oxygen to the pulp with the laccase. However, CHANDRA does state that prior to treatment the pulp is fluffed and dried. It would be obvious to the person of ordinary skill in the art to perform fluffing and drying in air especially given the explicit teaching otherwise by CHANDRA. The pulp which has been dried in air and fluffed naturally will bring some air into the reaction bag. Therefore, oxygen via air would be present during the reaction.

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***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. CALANDRA whose telephone number is (571) 270-5124. The examiner can normally be reached on Monday through Thursday, 7:30 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Anthony J Calandra/  
Examiner, Art Unit 1791

/Eric Hug/  
Primary Examiner, Art Unit 1791